

# PATENT SPECIFICATION

(11) 1202 238

## DRAWINGS ATTACHED

1202 238

- (21) Application No. 42664/67 (22) Filed 19 Sept. 1967  
 (31) Convention Application No. C 40893 X/39a\*  
 (32) Filed 6 Dec. 1966 in  
 (33) Germany (DT)  
 (45) Complete Specification published 12 Aug. 1970  
 (51) International Classification B 29 h 17/16  
 (52) Index at acceptance B7C 74E6



## (54) IMPROVEMENTS IN OR RELATING TO TYRE BUILDING MACHINES

- (71) We, CONTINENTAL GUMMI-  
 WERKE AKTIENGESELLSCHAFT, of Con-  
 tinental-Haus/Postfach 169, Hannover, Ger-  
 many, a German Body Corporate, do hereby  
 declare the invention, for which we pray  
 that a patent may be granted to us, and the  
 method by which it is to be performed, to  
 be particularly described in and by the  
 following statement:—  
 The invention relates to a tyre building  
 machine of the kind comprising a building  
 drum, having an inflatable diaphragm made  
 of resilient material which is fastened at its  
 edges to end walls, the mutual spacing of  
 which is variable in such a way that they  
 are evenly spaced from the mid circum-  
 ferential plane of the drum in every setting.  
 With known building machines of this  
 kind, the previously mentioned end walls of  
 the drum are supported by telescopically-  
 interfitting tubes, which are separately slid-  
 able on the drum shaft.  
 The invention is concerned with the prob-  
 lem of simplifying the positioning of the  
 end walls and of producing a building  
 machine such that it is especially suitable for  
 the insertion of detachable, interchangeable  
 drums.  
 According to the invention, a tyre building  
 machine comprises a building drum having  
 an inflatable diaphragm made of resilient  
 material which is fastened at its edges to end  
 walls, the mutual spacing of which is variable  
 in such a way that the end walls are evenly  
 spaced from the mid-circumferential plane of  
 the drum in every setting, wherein one end  
 wall is attached to one end of a shaft for  
 rotatably driving the drum, by means of a  
 tubular hub co-axial with the shaft, for axial  
 and rotary movement with the shaft and the  
 other end wall is mounted for axial move-  
 ment relative to and rotary movement with  
 the hub, means being provided for simul-

tanecusly axially moving the shaft and the  
 hub and the end wall attached thereto in  
 one direction and the other end wall in the  
 opposite direction symmetrically with respect  
 to the mid-circumferential plane of the drum.

An alteration in the spacing between the  
 two end walls of the drum, which serves  
 the purpose of expanding or altering the drum  
 contour, is consequently effected by an axial  
 movement of the shaft and the end wall  
 mounted thereon on the one hand, and an  
 axial movement of the other end wall relative  
 to the shaft, on the other. Consequently,  
 additional bearings or tubing members for  
 the other end wall of the drum are not  
 required.

This hub can be detachably mounted on  
 the free end of the drum shaft. Nevertheless,  
 it is possible to bring about the previously-  
 mentioned movement of the two end walls of  
 the drum symmetrically in the same or oppo-  
 site directions in relation to the mid-circum-  
 ferential plane of the drum. The end wall  
 firmly fixed on the hub is moved by a longi-  
 tudinal movement of the drum shaft, whilst  
 the other end wall movably mounted on the  
 hub is moved in the direction of the other  
 end wall, or in the opposite direction, by  
 driving members present in the tyre building  
 machine. In order that the drum in such a  
 machine can be removed in its entirety, the  
 hub is detachably connected to the shaft.

Further features of the invention are ex-  
 plained below with reference to the accom-  
 panying drawing, in which an embodiment is  
 shown by way of example, the single figure  
 being a diagrammatic cross-section of a tyre  
 building machine.

A drum shaft 1, which is supported at one  
 end in a frame 2, is mounted for longitudinal  
 movement on the frame 2 of the machine.  
 The drum shaft 1 has, at its free end 3 a  
 bearing surface limited by a collar 4, for

[Price 5s. Od. (25p)]

the attachment of a hub 5 of a building drum, which hub has a fixed end wall 6 on the end of the hub 5 facing away from the machine frame 2 and an axially movable end wall 7 on its end facing the machine frame 2. The two end walls 6, 7, are used for securing the edges of a flexible inflatable diaphragm 8, which is supported by struts as indicated at 9. The building drum is safeguarded against any accidental removal from the shaft by a lock ring 10.

A shaft 11 is mounted on the machine frame which shaft can be turned by a driving means 12 and has threaded portions 13, 14, at opposite ends, with one threaded portion having a left-hand thread and the other a right-hand thread both threaded portions having the same pitch. The threaded portion 13 fits into a driving disc 15 which in turn fits freely into a circumferential groove 16 upon the drum shaft 1, whilst the threaded portion 14 is drivingly connected to an axially movable tube 17, which is provided, at the end facing the end wall 7, with hooks 18 which lock into the end wall 7.

Because of the shaft 11, the two end walls 6, 7 can be moved simultaneously equal distances in opposite directions on actuation of the driving means 12, wherein the end wall 7 is moved by the tube 17 and the end wall 6 is moved by the drum shaft 1 which undergoes a corresponding axial movement so that the end walls are always equally spaced from the drum mid-circumferential plane.

The hooks 18 which fit into a circumferential groove 19 in the end wall 7 are under the action of springs (not shown), which tend to remove the hooks 18 from the groove 19.

Engagement of the hooks 18 is nevertheless ensured whenever they are enclosed by a further, likewise axially-movable, tube 20. By movement of the tube 20 in the direction towards the machine frame, the hooks 18 can thus be disengaged and by its movement in the opposite direction, they can be brought into the operative position.

Recesses 21 are provided on the inside of the end wall 7 for engagement by projections on an annular member 22 to form a bayonet-like connection. The engagement of the recesses and the projections locks the end wall 7 so as to prevent axial movement of the end wall 7 relative to the hub 5. The member 22 is mounted on the hub 5 so as to be rotatable to allow engagement and disengagement of the recesses and projections co-axial with the shaft 1.

The rotation of the member 22 is caused by a ring 23 co-axial with the shaft 1. The ring 23 is movable axially so as to contact the member 22 and has end surfaces 23a which engage with end surfaces 22a of the member 22 such that rotation of the

ring 23 in either direction causes rotation of the member 22.

If the end wall 7 is immovably connected to the hub 5 by the member 22, the hooks 18 are lifted out from the groove 19 due to the movement of the tube 20 and furthermore, if the ring 10 is released, the building drum can thus be withdrawn from the drum shaft 1, even if the space surrounded by the inflatable diaphragm 8 is under pressure.

The shaft 1 is rotated by means of an axially fixed wheel 24, and in order to provide rotation regardless of the axial position of the shaft 1, a key 25 is provided engaging in a longitudinal slot 26 in the shaft 1.

#### WHAT WE CLAIM IS:—

1. A tyre building machine comprising a building drum having an inflatable diaphragm made of resilient material which is fastened at its edges to end walls, the mutual spacing of which is variable in such a way that the end walls are evenly spaced from mid-circumferential plane of the drum in every setting, wherein one end wall is attached to one end of a shaft for rotatably driving the drum, by means of a tubular hub co-axial with the shaft, for axial and rotary movement with the shaft and the other end wall is mounted for axial movement relative to and rotary movement with the hub, means being provided for simultaneously axially moving the shaft and the hub and the end wall attached thereto in one direction and the other end wall in the opposite direction symmetrically with respect to the mid-circumferential plane of the drum.

2. A tyre building machine as claimed in claim 1, in which the hub is detachably mounted on the shaft.

3. A tyre building machine as claimed in claim 2, in which the axial movement of the other end wall relative to the hub is preventable by a releasable bayonet connection between the hub and the said other end wall.

4. A tyre building machine as claimed in claim 3, in which the bayonet connection is provided by recesses in the other end wall and projections on an annular member rotatably mounted on the tubular hub and engageable in these recesses.

5. A tyre building machine as claimed in claim 4, having an axially and rotatably movable ring co-axial with the shaft, one end of the ring being arranged to engage the annular member to connect and disconnect the bayonet connection by rotation of said ring.

6. A tyre building machine according to any preceding claim in which hooks engageable in the other end wall for transmitting axial movement to the said other end wall from the means for simultaneously moving the shaft and the hub in one direction and the said other end wall in the opposite direc-

tion, are removable from the other end wall by spring action and are moved into engagement with said other end wall by external application of an axially movable tubular member.

- 5 7. A tyre building machine, substantially as hereinbefore described with reference to the accompanying drawing.

POLLAK, MERCER & TENCH,  
Chartered Patent Agents,  
Audrey House, Ely Place,  
London, E.C.1.  
Agents for the Applicants.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa. 1970.  
Published by The Patent Office, 25 Southampton Buildings, London WC2A 1AY, from  
which copies may be obtained.

1202238

COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

